30KPA28A thru 30KPA288CA, e3

30kW Transient Voltage Suppressor

Microsemi
SCOTTSDALE DIVISION

FOR

DESCRIPTION

These Microsemi 30 kW Transient Voltage Suppressors (TVSs) are designed for applications requiring protection of voltage-sensitive electronic devices that may be damaged by harsh or severe voltage transients including lightning per IEC61000-4-5 and class levels with various source impedances described herein. This series is available in 33 to 400 volt standoff voltages (V_{WM}) in both unidirectional and bi-directional with either 5% or 10% tolerances of the Breakdown Voltage (V_{BR}). Microsemi also offers numerous other TVS products to meet higher or lower power demands and special applications.

APPEARANCE



IMPORTANT: For the most current data, consult *MICROSEMI's* website: http://www.microsemi.com

FEATURES @ 25ºC UNLESS OTHER WISE SPECIFIED

- Available in both Unidirectional and Bidirectional construction (Bidirectional with a CA suffix)
- Suppresses transients up to 30 kW @ 10/1000 µs and 200 kW @ 8/20 µs (see Figure 1)
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020B
- Glass passivated chip junction in a P600 package
- Reverse leakage below 2 µA for voltages above 73 volts V_{BR}
- Optional 100% **screening for avionics grade** is available by adding MA prefix to part number for added 100% temperature cycle -55°C to +125°C (10X) as well as surge (3X) and 24 hours HTRB with post test V_Z & I_R (in the operating direction for unidirectional or both directions for bidirectional)
- Options for screening in accordance with MIL-PRF-19500 for JANTX are available by adding MX prefix to the part number.

RoHS Compliant devices available by adding "e3" suffix

APPLICATIONS / BENEFITS

- Protection from switching transients and induced RF
- Protection from ESD, and EFT per IEC 61000-4-2 and IEC 61000-4-4
- Secondary lightning protection per IEC61000-4-5 with 42 Ohms source impedance:
  Class 1,2,3,4: 30KPA33A - 30KPA400A or CA
  Class 5: 30KPA33A - 30KPA400A or CA
  Class 5: 30KPA33A - 30KPA220A or CA (long distance)
- Secondary lightning protection per IEC61000-4-5 with 12 Ohms source impedance:
  Class 1,2, 3: 30KPA33A to 30KPA400A or CA
  Class 4: 30KPA33A to 30KPA220A or CA
- Secondary lightning protection per IEC61000-4-5 with 2 Ohms source impedance:
  Class 2: 30KPA33A to 30KPA400A or CA
  Class 3: 30KPA33A to 30KPA220A or CA
  Class 4: 30KPA33A to 30KPA110A or CA

MAXIMUM RATINGS

- Peak Pulse Power dissipation at 25°C: 30,000 watts at 10/1000 µs (also see Figures 1 and 2)
- Impulse repetition rate (duty factor): 0.05%
- $t_{clamping}$ (0 volts to $V_{(BR)}$ min.): < 100 ps theoretical for unidirectional and < 5 ns for bidirectional
- Operating & Storage temperature: -65°C to +150°C
- Thermal resistance: 17.5°C/W junction to lead, or 77.5°C/W junction to ambient when mounted on FR4 PC board with 4 mm^2 copper pads (1oz) and track width 1 mm, length 25 mm
- Steady-State Power dissipation: 7 watts at T_L = 27.5°C, or 1.61 watts at T_A = 25°C when mounted on FR4 PC board described for thermal resistance
- Forward Surge: 400 Amps 8.3 ms half-sine wave for unidirectional devices only
- Solder temperatures: 260°C for 10 s (maximum)

MECHANICAL AND PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy P600 package meeting UL94V-0
- FINISH: Tin-Lead or RoHS compliant annealed matte-Tin plating readily solderable per MIL-STD-750, method 2026
- MARKING:
  - Polarity band when required
  - MSC Microsemi
  - Part Number 30KPAXX
  - WW/YY Date code
- POLARITY: Band denotes cathode. Bidirectional not marked for polarity
- WEIGHT: 0.07oz or 2.5grams (approximate)
- TAPE & REEL option: Standard per EIA-296 for axial package (add "TR" suffix to part number)
- See package dimension on last page

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ELECTRICAL CHARACTERISTICS @ 25°C UNLESS OTHER WISE SPECIFIED

Part Number	Rated Stand-off Voltage V_{WM}	Breakdown Voltage $V_{(BR)}$ Volts @ $I_{(BR)}$		Maximum Clamping @ I_{PP} 10/1000µs V_C	Maximum Reverse Leakage @ V_{WM} I_D	Maximum Peak Pulse Current I_{PP}
		$V_{(BR)}$	$I_{(BR)}$			
	VOLTS	VOLTS MIN	mA	VOLTS	µAmps	Amps
30KPA28A	28	31.28	50	50.0	5000	**606.0**
30KPA30A	30	33.51	50	55.2	5000	**548.9**
30KPA33A	33	36.90	50	58.5	5000	**517.9**
30KPA36A	36	40.20	50	61.8	5000	**490.3**
30KPA39A	39	43.60	20	67.2	2000	**450.9**
30KPA42A	42	46.90	10	72.0	1000	**420.8**
30KPA43A	43	48.00	20	73.0	1000	**415.1**
30KPA45A	45	50.30	10	77.4	250	**391.5**
30KPA48	48	53.60	5	81.6	150	**371.3**
30KPA51A	51	57.00	5	86.4	50	**350.7**
30KPA54A	54	60.30	5	91.4	20	**331.5**
30KPA58A	58	64.80	5	92.4	20	**327.9**
30KPA60A	60	67.00	5	102.0	15	**297.2**
30KPA64A	64	71.50	5	104.0	10	**291.3**
30KPA66A	66	73.70	5	107.0	2	**283.2**
30KPA70A	70	78.20	5	109.0	2	**278.0**
30KPA71A	71	79.30	5	111.5	2	**271.7**
30KPA72A	72	80.40	5	114.0	2	**265.8**
30KPA75A	75	83.80	5	119.4	2	**253.8**
30KPA78A	78	87.10	5	129.0	2	**234.9**
30KPA184A	84	93.80	5	139.2	2	**217.7**
30KPA90A	90	100.50	5	146.4	2	**207.0**
30KPA96A	98	107.20	5	156.0	2	**194.2**
30KPA102A	102	113.90	5	165.6	2	**183.0**
30KPA108A	108	120.60	5	175.2	2	**172.9**
30KPA120A	120	134.00	5	194.4	2	**155.9**
30KPA132A	132	147.4	5	213.0	2	**142.3**
30KPA144A	144	160.80	5	223.2	2	**135.8**
30KPA150A	150	167.60	5	233.4	2	**129.8**
30KPA156A	156	174.30	5	245.0	2	**123.7**
30KPA160A	160	178.20	5	252.6	2	**252.6**
30KPA168A	168	187.70	5	272.4	2	**272.4**
30KPA170A	170	189.90	5	275.0	2	**110.2**
30KPA180A	180	201.10	5	290.4	2	**104.3**
30KPA198A	198	221.20	5	319.8	2	**94.7**
30KPA216A	216	241.30	5	346.6	2	**86.9**
30KPA240A	240	268.10	5	387.0	2	**78.3**
30KPA258A	258	288.20	5	416.4	2	**72.8**
30KPA260A	270	290.40	5	416.0	2	**72.8**
30KPA270A	270	301.60	5	436.2	2	**69.5**
30KPA280A	280	312.80	5	464.0	2	**65.3**
30KPA288A	288	321.70	5	469.9	2	**64.5**

NOTE: For bidirectional construction, indicate a CA suffix after the part number.

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SYMBOLS & DEFINITIONS

Symbol	Definition	Symbol	Definition
V_{WM}	Working Peak (Standoff) Voltage	I_{PP}	Peak Pulse Current
P_{PP}	Peak Pulse Power	V_C	Clamping Voltage
$V_{(BR)}$	Breakdown Voltage	$I_{(BR)}$	Breakdown Current for $V_{(BR)}$
I_D	Standby Current		

GRAPHS

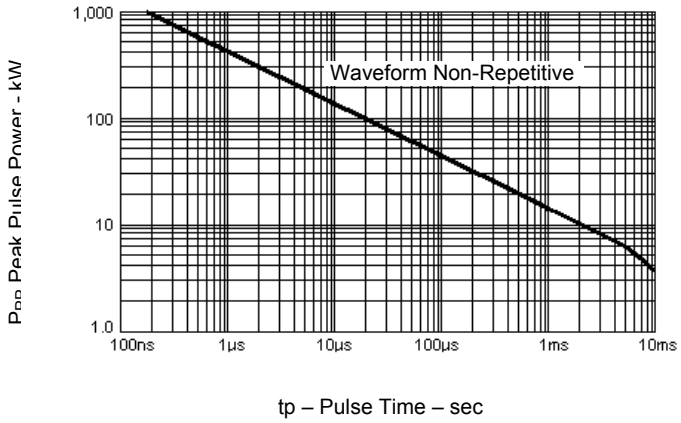


FIGURE 1
Peak Pulse Power vs. Pulse Time to 50% of

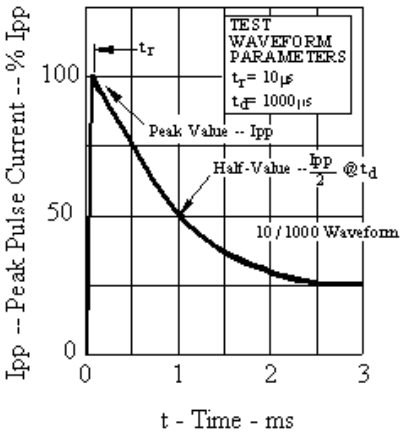


FIGURE 2
Pulse Waveform

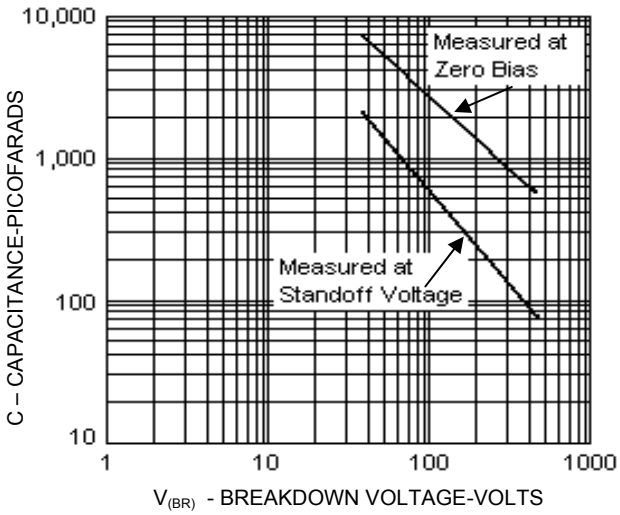
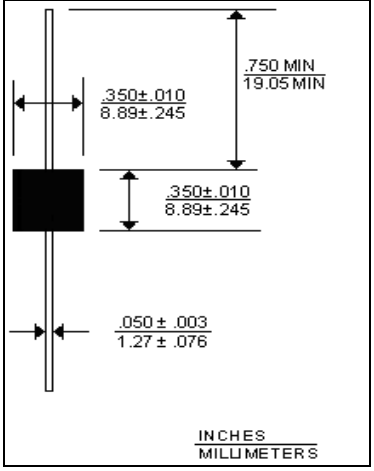


FIGURE 3
Typical Capacitance vs. Breakdown Voltage

DIMENSIONS



NOTE: For Bidirectional Construction, indicate a CA suffix after part number. Capacitance will be one-half that shown in Figure 3.

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